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SPATIAL DIFFERENTIATION OF THE ECONOMIC STRUCTURE OF THE RUSSIAN REGIONS OF THE ARCTIC ZONE¹

The regions situated in the Arctic zone of Russia perform an important function in the implementation of the export potential of the country. As one of favourable factors for the development of production in the Arctic Zone, we have to consider the richest natural and resource potential of dry land and the sea. Negative factors limiting the development of the Arctic zone: the harsh natural and climatic conditions and the remoteness of the region from the subjects of the Russian Federation which have a higher level of socio-economic development, low level of economic development (including infrastructure) of these territories, low demographic capacity of the population.

The research is aimed at revealing the existing spatial differentiation of the kinds of economic activity in the latitudes of the northern districts of the country. In order to assess the differences in the industry structure of the gross added value of all the constituent entities of the Russian Federation whose territories to the Arctic zone, some graphs and map-schemes have been drafted. In addition, the authors also assessed the deviation of the industry breakdown from the average values observed in the Russian Federation as a whole.

The analysis of the specifics of the spatial differentiation of the types of economic activity in the economy of the Arctic regions allows to reveal certain trends in the future development of the economic structures.

The article is intended for specialists and students interested in the problems of the development of the northern regions of Russia.

Keywords: The Arctic Zone of Russia, natural resources potential, the extent of economic development of a territory, types of activity, spatial differentiation of structure, territorial organization of the industry, regional development

The subjects of the Russian Federation whose territories belong to the Arctic Zone of Russia² are situated from the north-western border to the north-eastern extremity of the country; to list them from West to East, these are the Murmansk and the Arkhangelsk Regions, the Nenets Autonomous Okrug, the Komi Republic, the Yamal-Nenets Autonomous Okrug, the Krasnoyarsk Territory, the Republic of Sakha (Yakutia), and the Chukchi Autonomous Okrug. All these territories in the north are coming out to the coast of the seas of the Arctic Ocean from the Barents Sea to the Chukchi Sea. The southern borders of the territories of the Arctic zone reach 62 degree of north latitude (the southernmost point of the Chukotka Autonomous Okrug is Cape Rubicon).

We will hereinafter distinguish between the following: the territories of the Arctic Zone specified in the Decree of the President of the Russian Federation and the subjects of the Arctic area which are parts of the constituent entities of the Russian Federation which have a part of their territories in the Arctic zone. From the point of view of the integrity of an entity, the whole of Krasnoyarsk Territory, stretching for over 3,000 km along the meridian, is included in the Arctic Zone of Russia, although in a stricter geographical sense only the northern parts of the Krasnoyarsk Territory belong to the

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² The Arctic zone of the Russian Federation includes the following subjects of the Russian Federation: the Nenets Autonomous Okrug, the Yamal-Nenets Autonomous Okrug, and the Chukotka Autonomous Okrug, and the territory of some municipal entities of the following subjects of the Russian Federation: the Murmansk Region, the Arkhangelsk Region, the Republic of Sakha (Yakutia), the Komi Republic and the Krasnoyarsk Territory. (Decree of the President of the Russian Federation of May 2, 2014 No. 296 "On the Land Territories of the Arctic Zone of the Russian Federation").

Arctic zone: the territory of the urban district of Norilsk town, the Taymyrsky, Dolgan-Nenets and Turukhansky municipal districts.

As the favorable factors for the development of industry in these regions and their economy as a whole, one has to consider the richest natural resource potential of the dry land and the sea in these regions, including fuel and energy reserves (oil, natural gas, coal), ferrous and non-ferrous metal ore, wood resources, and marine bioresources. Another favorable factor is the fact that all the entities have access to the seas of the Arctic Ocean and can use northern sea route as the shortest transport bridge between the economies of the northern regions of Russia, the western areas with the eastern ones, as well as between a number of the countries of North-Western Europe with the dynamically developing countries of the Asia-Pacific region [2, p. 47-80].

Among the negative factors limiting the development of the natural resources of the Arctic Zone it is necessary to take into consideration the harsh natural / climatic conditions (low air and water temperatures, polar night, tundra and forest tundra environment, permafrost) and the severe remoteness of the region from the subjects of the Russian Federation which are more advanced socially and economically, weak economic (including infrastructural) development of this territory, low demographic capacity of the population [1, p. 248-249; 5, p. 61-64].

The most essential precondition for the regional development of all the zone within the latitudes under consideration is the existing spatial differentiation of the kinds of the population's economic activity, and in the broader sense, this is the territorial organization of the economy. A well-ordered location of the enterprises and their combinations in a territory, together with the establishment of economic ties with each other and their interrelations with the territory is understood as the territorial organization of the economy [3, p. 207]. On one hand, the territorial organization of an industry reflects regional differences implemented in the actual development of the Arctic regions, certain inertia that they are characterized by, while on the other hand it reflects some future trends in the development of the territorial economic structures.



Fig. 1. The industry structure of the gross added value produced in the constituent entities of the Russian Federation whose territories belong to the Arctic zone, in 2012. (source: *Russian Regions. Socio-economic indicators*. Moscow, 2013. p. 417, as well as the data of the Rosstat's site http://www.gks.ru/free_doc/new_site/vvp/dusha98-12.xls, accessed on: 31.10.2014)

Table 1

The industry structure of the gross added value produced in the subjects belonging to the Arctic zone of the Russian Federation in 2012 (current prices, % of the total)

Industry	Russian Federation	The Murmansk Region	The Arkhangelsk Region	The Nenets Autonomous Okrug	The Komi Republic	The Yamal-Nenets Autonomous Okrug	The Krasnoyarsk Territory	The Republic of Sakha (Yakutia)	The Chukotka Autonomous Okrug
Gross added value in basic prices, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Including:									
Agriculture, hunting and forest industry	4.2	0.7	4.3	0.3	1.8	0.2	3.6	2.3	1.5
Fishery, pisciculture	0.2	7.4	1.6	0.6	0.0	0.0	0.0	0.0	1.4
Extraction of minerals	11.2	16.5	1.7	71.0	32.2	52.0	15.2	42.9	35.2
Manufacturing companies	17.3	13.3	19.3	0.3	10.7	1.2	30.7	2.0	0.2
Electricity, gas, and water production and distribution	3.8	6.0	3.8	0.7	3.6	2.0	3.5	3.8	11.5
Construction	7.1	4.8	8.7	8.7	15.2	8.5	-7.8	10.0	11.1
Wholesale and retail trade; repair of motor vehicles, motorcycles, household goods and personal items	18.2	9.6	11.7	5.7	5.1	11.9	9.2	7.0	10.0
Hotels and restaurants	1.0	1.3	1.1	0.3	0.7	0.6	0.8	0.6	1.2
Transport and communication	10.4	8.6	17.5	5.6	10.0	9.5	9.0	10.6	4.8
Financial activities	0.6	0.2	0.3	0.0	0.2	0.0	0.3	0.3	0.0
Operations with real estate, property rent and services provision	11.9	8.3	7.5	2.5	7.3	8.1	6.6	4.4	1.1
Public administration and provision of military security, social insurance	5.6	10.5	10.0	2.0	5.9	2.3	5.6	6.4	11.4
Education	3.1	3.9	4.3	0.9	2.7	1.3	2.9	4.4	4.2
Public health and social services provision	4.0	7.5	6.8	1.1	3.8	1.8	3.7	4.0	5.3
provision of other utilities, social and personal services	1.4	1.4	1.4	0.3	0.8	0.6	1.1	1.3	1.1
household activity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Based on the data from: Russian Regions. Socio-economic indicators. 2013: Statistical Book. Moscow, 2013. p. 417.

We have analyzed the existing spatial differentiation of the industry structure of the economy (in gross added value) in the latitudinal direction in respect of the subjects of the Russian Federation which have territories belonging to the Arctic zone of the country. (Fig. 1). For this purpose we used the data presented in Table 1.

The specifics of the latitude differentiation of the economy of the subjects of the Russian Federation, the territory of which belong to the Arctic Zone of the country, are presented on our map-scheme (Fig. 1) which reflects the gross added value for the core and subsidiary types of economic activity, according to the data as of 2012. The most prominent among the core activities of the Murmansk region are fishery, fish processing, mining of non-ferrous and precious metal ores, machinery and equipment manufacturing and repairs, transport; in the Arkhangelsk region, the core activities are precious metals and diamond mining, forest harvesting and processing of wood, machinery and



Fig. 2. The industry structure of production (with its breakdown into the types of economic activity) in the territories of the Arctic Zone of the Russian Federation in 2012 (source: Russian Regions. Socio-economic indicators. 2013: Statistical Book. Moscow, 2013, p. 417)

equipment manufacturing and repairs, transport; in the Nenets Autonomous Okrug, these are the production of natural gas and oil, the mining of precious metals; in the Komi Republic, coal and precious metals mining; in the Yamal-Nenets Autonomous Okrug, the extraction of oil and natural gas; in the Krasnoyarsk Territory, the mining of non-ferrous and precious metal ores; in the Sakha Republic (Yakutia), non-ferrous and precious metal ores mining, diamonds mining; in the Chukotka Autonomous Okrug, non-ferrous metal ores mining.

In the consideration of the specifics of the sector-wise structure of the industry, in terms of the diversity of the types of activity in the territories of the Arctic Zone of Russia (Fig. 2), a certain similarity of their production specialization is observed: For example, mining of non-ferrous and precious metal ores is present in all the regions. At the same time, significant territorial differences have built up in respect of economic potential and demographic capacity between the western regions and the eastern ones. As a whole, the demographic capacity is undergoing a significant decline, but in general the diversity of the types of activity is preserved.

The similarities and the differences of the industry structure of Arctic Zone territories are primarily determined by the influence of the outlined territorial combinations of natural resources on the placement of production facilities, as well as by the complex of social / economic and geographical factors: remote economic / geographical position, severe natural and climatic conditions, weak development of infrastructure, etc.

The level of economic development of the subjects is reflected in the gross regional product per capita (thousand rubles, in 2012). This indicator is the highest for the Nenets Autonomous Okrug and Yamal-Nenets Autonomous Okrug (3,841,000 rubles and 2,211,500 rubles, respectively), due to the significant role of export oriented mining companies (oil and natural gas production) in the industry structure of these regions. The Arkhangelsk Region and the Murmansk region have the lowest values (297,300 rubles and 357,400 rubles, respectively), and an important place in their economy belongs to manufacturing and transport services (Fig. 3).

On the basis of data of the Table 1, we drew the diagrams representing the spatial differentiation of a number of economic activity types on the subjects of the Arctic Zone of the Russian Federation, in the direction from the West to the East. These indicators were also compared to the average values for Russia. At the same time, it was taken into consideration that agriculture (deer farming), hunting and forest farming, fishery and pisciculture, mining of minerals, production and distribution of electricity and gas, as well as manufacturing, transport (sea transport) and other types of activity are basic and constitute the regions' specialization, whereas wholesale and retail trade, repairs of motor vehicles,

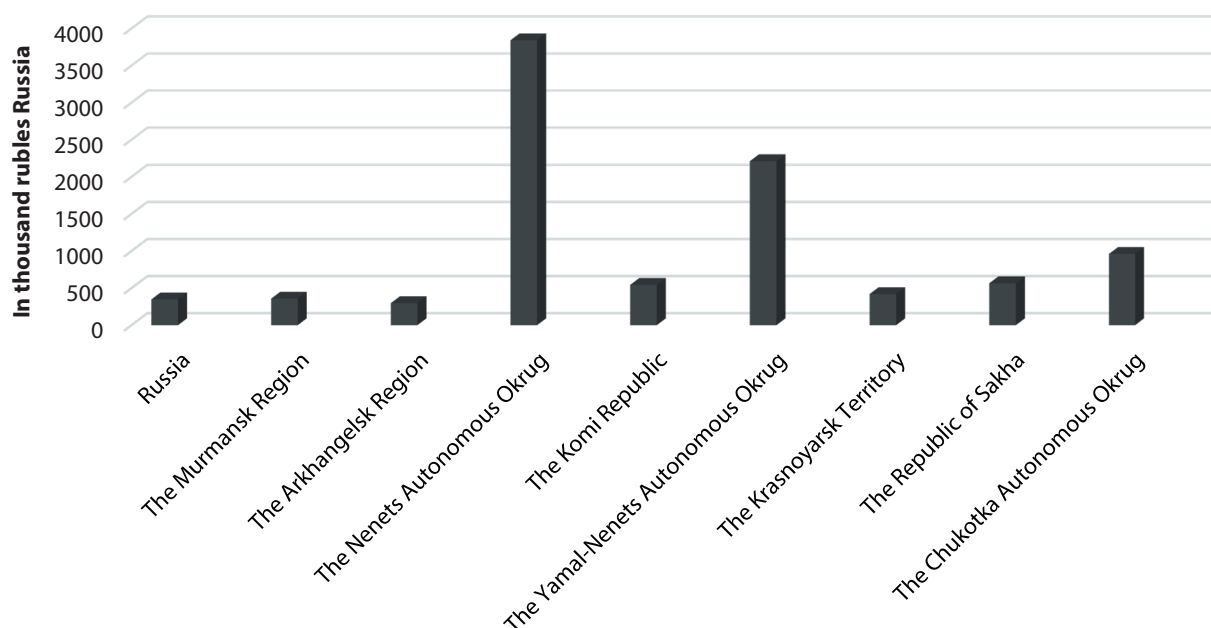


Fig. 3. The gross regional product per capita for the Russian Federation as a whole and the territories of the Arctic Zone of the Russian Federation in 2012. (source: Russian Regions. Socio-economic indicators. 2013: Statistical Compilation, Moscow, 2013, p. 417)

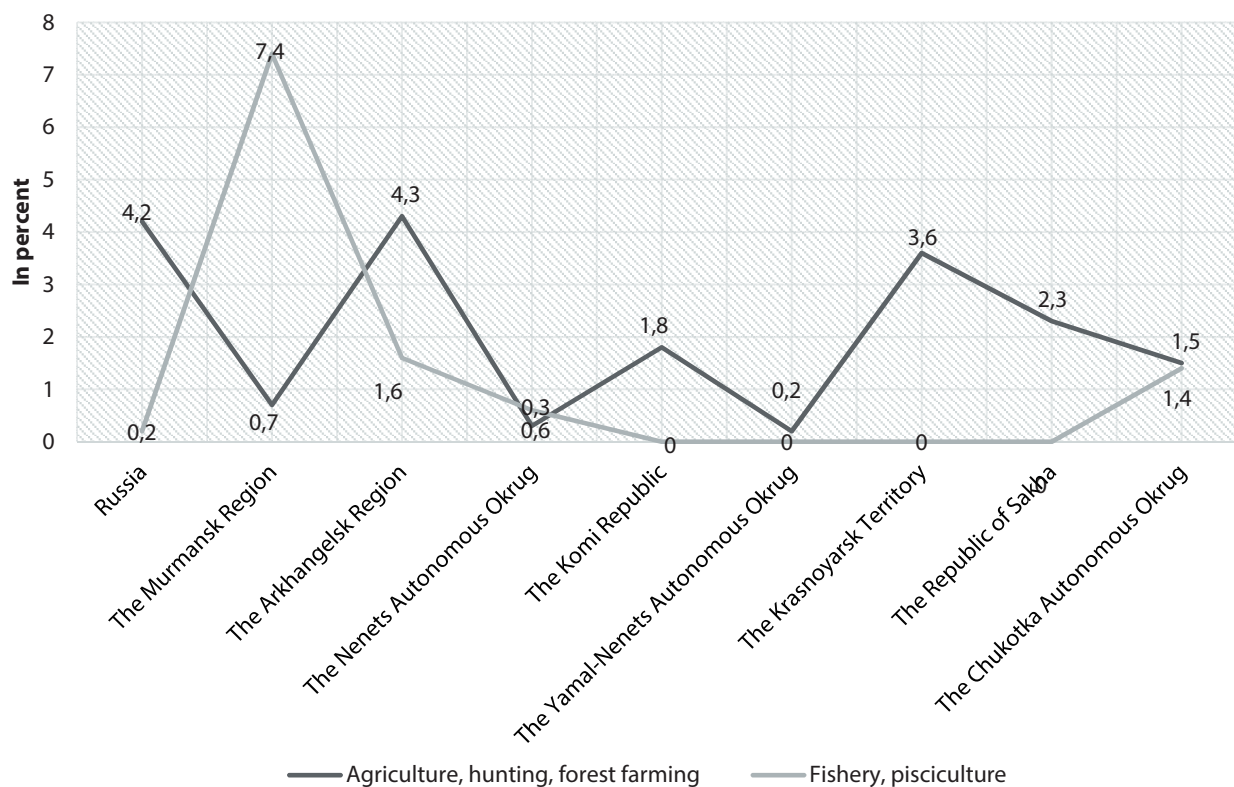


Fig. 4. The distribution of the shares of agriculture, hunting, and forest farming; fishery and pisciculture in terms of the gross added value for the subjects of the Arctic Zone of the Russian Federation for 2012, %

hotels and restaurants, education, public health care services, and the provision of other utilities, social and personal services, etc., serve the needs of the core economic activities and the needs of the population. The levels of the development of the latter are more correlated with the overall level (amount) of the development of the core activities of the population and the size of the population.

For instance, the spatial differentiation of the two kinds of activity: “agriculture, hunting, and forest farming” and “fishery, pisciculture” is presented in Fig. 4. As the figure shows, the Arkhangelsk Region and the Krasnoyarsk Territory stand out among the other entities of the Arctic Zone in terms of their share of agriculture, hunting, and forest farming in the gross added value structure. At the same time, only in the Arkhangelsk Region the share of agriculture, hunting, and forest farming reaches

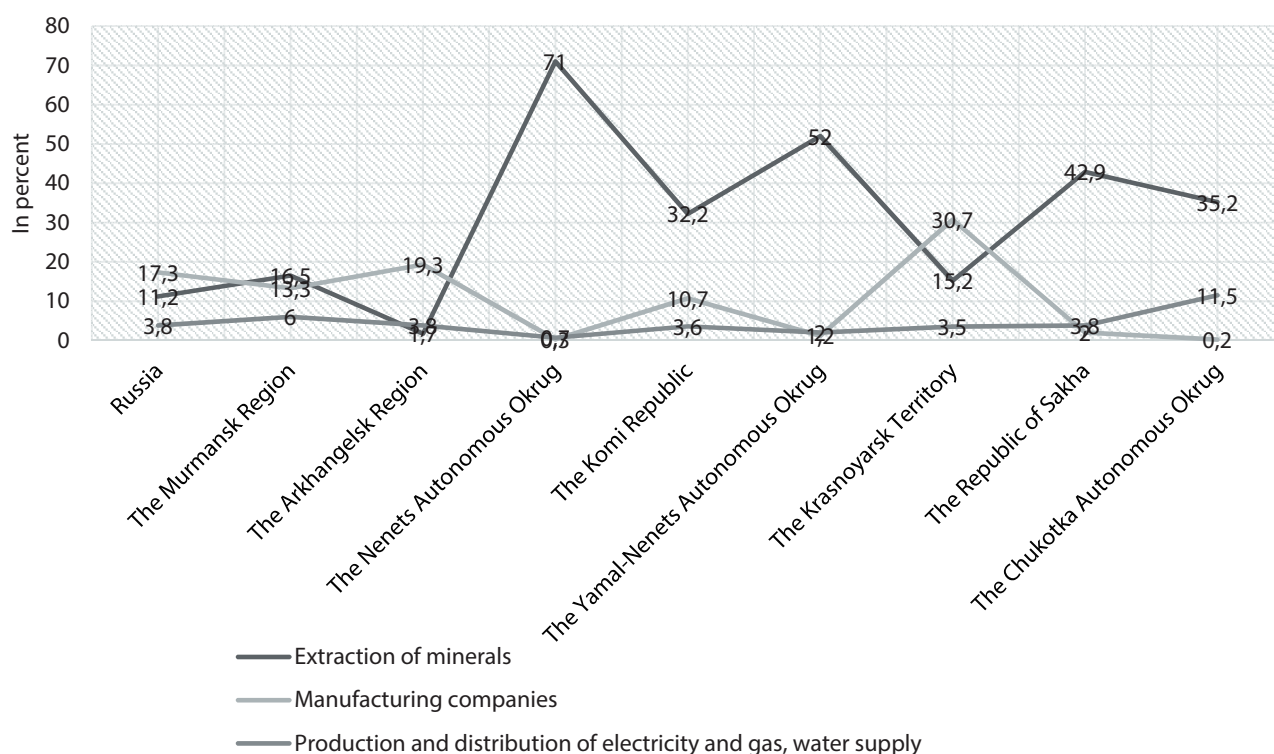


Fig. 5. The distribution of the share of mining, manufacturing, production and distribution of electricity, gas and water supply in the gross added value of the entities of the Arctic Zone of the Russian Federation in 2012, %

the average level of the Russian Federation (the Arkhangelsk Region — 4.3 %, the Russian Federation — 4.2 %). This is mainly due to the forest farming, as these constituent territories of the Russian Federation have significant timber reserves. For example, 3.2 % of Russia's total reserve of wood is concentrated in the Arkhangelsk Region, and 3.6 %³ in the Komi Republic.

The Murmansk region and the Arkhangelsk Region, the Chukotka Autonomous Okrug have a prominent position in terms of fishery and pisciculture. The large share of this type of economic activity in the structure of the gross added value in the Murmansk region reflects the fact that it is the main fishing region in the north-western part of the country. For example, in 2012 the amount of fish caught and bioresources extracted by business entities of the Murmansk region was 571,100 tons (in 2013, it went up to 700,300 tons). In 2012, the Murmansk Region accounted for 13 % of the total amount of fish and fish products, processed and preserved, produced in the Russian Federation (in 2013, the share was also 13 %)⁴. Thus, in terms of the total quantity of the fish caught, as well as that of processed and canned fish products, the Murmansk Region had the third place among the regions of Russia according to the results of 2013, after the Kamchatka Territory and the Primorsky Territory.

The differentiation of the territories of the Arctic Zone of the country in the sphere of industrial production in terms of the share of the extraction of minerals; manufacturing enterprises; production and distribution of electricity, gas, and water supply in the gross added value is shown in Fig. 5. The regions whose structure of the gross added value is the closest to the average Russian values in respect of the share of extraction of minerals, processing enterprises, production and distribution of electricity and gas, and water supply, are the Murmansk Region, the Komi Republic, and the Krasnoyarsk Territory. Mining of minerals has the dominant position in the structure of gross added value of the other territories of the Arctic Zone of Russia. For example, whereas the share of raw materials industry in Russia as a whole is 11.2 %, it was 71.0 % in Nenets Autonomous Okrug, 52.0 % in Yamal-Nenets Autonomous Okrug, 42.9 % in the Republic of Sakha (Yakutia), and 35.2 % in Chukotka Autonomous Okrug; therefore, the share of processing industries here is low⁵. A special place among the extractive

³ See: Russian Regions. Socio-economic indicators. 2013: Statistical Compilation, Moscow, 2013, p. 417.

⁴ The web site of the All-Russian Online Club for Fishing, Rusfishing.RU. About fishery and fish processing manufacturing in the Murmansk region (<http://www.rusfishing.ru/newsfishworld/2571-10072014-o-rybolovstve-i-proizvodstve-rybnoj.html>; accessed on 13.10.2014).

⁵ Russian Regions. Socio-economic indicators. 2013: Statistical Compilation, Moscow, 2013, p. 482-483.

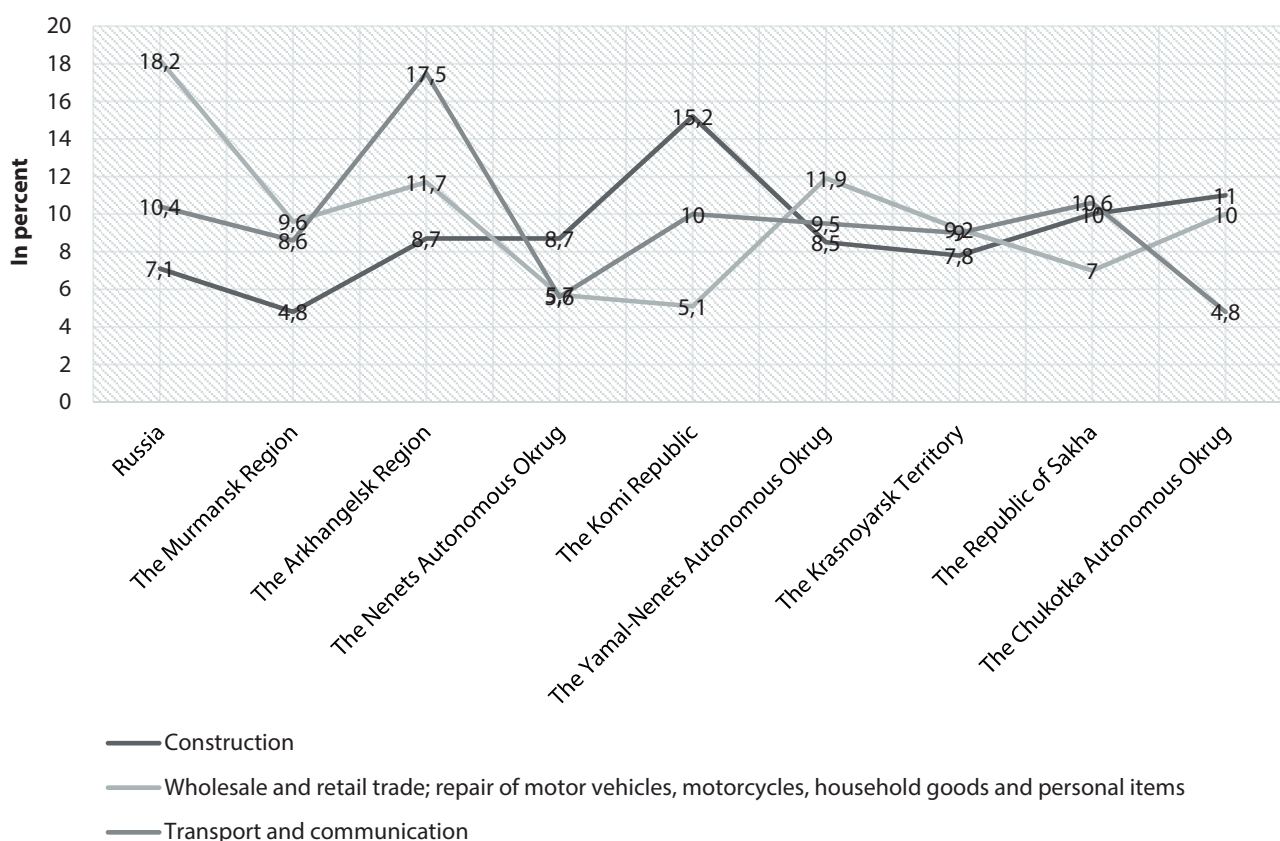


Fig. 6. The distribution of the share of construction; wholesale and retail trade, repairs of motor vehicles, motorcycles, household equipment and personal belongings; transport and communication in the gross added value of the subjects of the Arctic zone of the Russian Federation, in percent, 2012

industries of these entities of the Arctic Zone belongs to oil and natural gas production, as well as to the mining of ore of non-ferrous and precious metals.

It is worth mentioning the significant share of power generation and distribution, gas production and distribution, and water supply in the structure of the gross added value in almost all the subjects of the Arctic Zone of the Russian Federation, especially in the Murmansk region and Chukotka Autonomous Okrug. Such a situation is explained by the special role of this type of economic activity in the provision of the necessary conditions for the production enterprises and for the normal life of the population in the harsh natural/climatic conditions of the far north (low air temperatures, long polar night).

Figure 6 shows the indicators in the sphere of industrial services — construction, wholesale and retail trade, repairs of motor vehicles, motorcycles, household equipment and personal belongings, transport and communication differentiation of the regions.

The region whose structure of the gross added value is the closest to the average Russian values in respect of the share of construction; wholesale and retail trade, repairs of motor vehicles, motorcycles, household equipment and personal belongings; transport and communication — is the Arkhangelsk Region. The share of construction in the Komi Republic is twice as high as the average Russian value, which can be explained by the significant volumes of investments into fixed assets which the republic receives (for example, in 2011–2012 these investments accounted for 15 % of all fixed asset investments in the North-Western Federal District)⁶. The largest investment programs in the Komi Republic are currently being implemented in the forest sector (forest harvesting, wood processing, paper manufacturing), as well as in the development of the transport complex (construction and reconstruction of motor roads and rail roads of interregional importance, e.g., Arkhangelsk — Syktyvkar — Perm highway). Thus, an unified production and transport-logistic system is formed, which facilitates efficient use of the available natural resources and industrial potential of the Komi Republic for the development of interregional and international cooperation.

⁶ Russian Regions. Socio-economic indicators. 2013: Statistical Compilation, Moscow, 2013, p. 928.

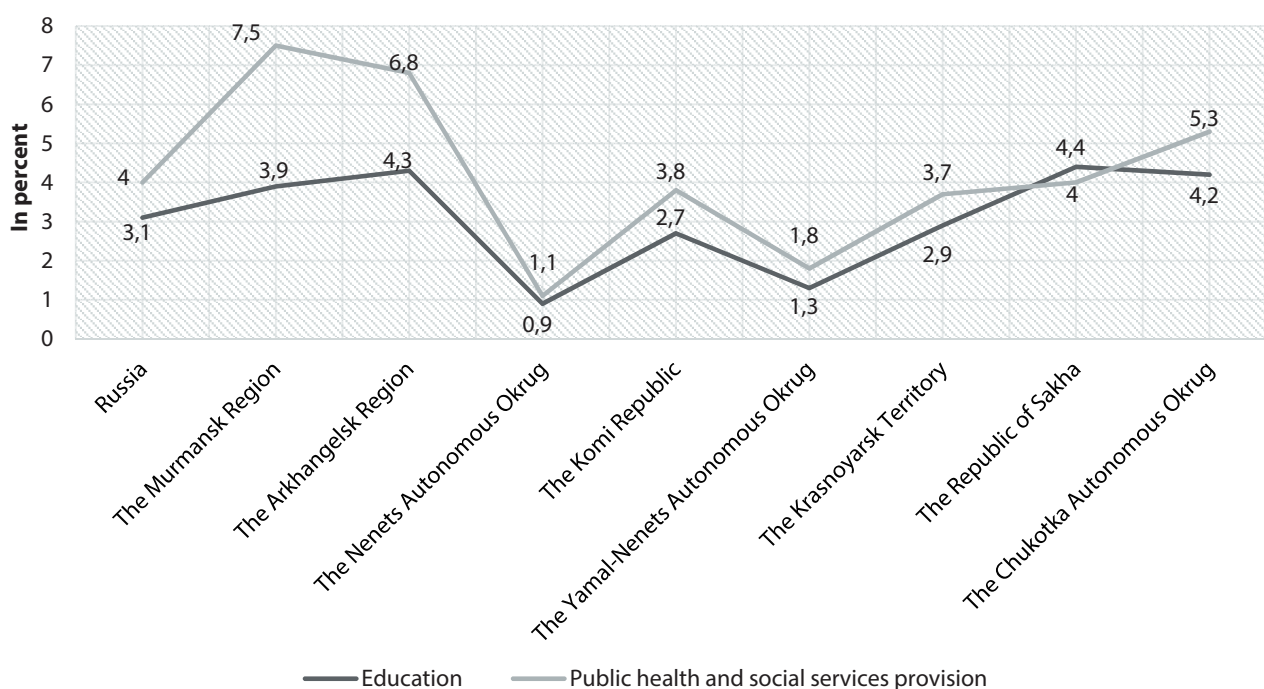


Fig. 7. Spatial differentiation of the shares of education, public health and social services provision in the gross added value for the territories of the Arctic area Zone of the Russian Federation in 2012, %

The differentiation of social services in the entities of the Arctic Zone of Russia (education, public health and provision of social services) is presented in Fig. 7. The shares of education and public health were the closest to the average values for the Russian Federation in case of the Komi Republic and Krasnoyarsk Territory. Relatively high level of the development of education and public health care in these entities of the Russian Federation is due to the fact that they belong to the social sphere of the Krasnoyarsk Territory and Komi Republic as a whole. As the Arctic proper territories of the Krasnoyarsk Territory consist of the municipalities of the urban district Norilsk and Taimyr Dolgan-Nenets municipal area, and those of the Republic of Komi include the municipal district of Vorkuta, which have a population size of, respectively, 210,400 and 84,700 people in 2014, the share of education and public health is significantly lower here.

It should be noted a relatively large share of the public health and the provision of social services in the structure of gross added value of the Murmansk region and the Arkhangelsk Region, which perform important national defense functions, and in this connection they have been recently provided with the most attractive social conditions for the population.

The significant deviations of the industry structure of the gross added value of the territories of the Arctic Zone of the Russian Federation from the industry structure of the Russian Federation in general are observed in the amount of the production of shipped goods, the performance of works and rendering of services by the enterprises, as well as by the financing activity, operations with real estate, lease and services provision.

It was the structural specifics in the mining of minerals, manufacturing industries, production and distribution of electricity and gas, water supply, that determined the significant deviation of the industry structure of the gross added value in the Republic of Sakha (Yakutia), the Chukchi Autonomous Okrug, the Yamal-Nenets Autonomous Okrug, Nenets Autonomous Okrug, and Komi Republic from the average gross added value indicators for the Russian Federation.

Therefore, the current state of the industry structure of the subjects of the Arctic zone of the Russian Federation (in terms of the gross added value) indicates that they are mainly in the initial stages of the economic development of their territory, which are characterized by the use of those territorial combinations of natural resources which can provide maximum profit within a short period of time and require the lowest capital investment. [4, p. 83-84]. The fact that the Arctic territories have quite a various structure of the service providing sectors (although some of them may be going out of date) creates some opportunities for the development of specialized industries here. The expected development of specialized, subsidiary, and service sector companies in the territories of the Arctic area of the Russian Federation will contribute to a more balanced placement of production, although it

Table 2

**Promising directions of the development of the constituent entities of the Arctic Zone of the Russian Federation
for the period before 2030**

Industry	The Murmansk Region	The Arkhangelsk Region	The Nenets Autonomous Okrug	The Komi Republic	The Yamal-Nenets Autonomous Okrug	The Krasnoyarsk Territory	The Republic of Sakha (Yakutia)	The Chukotka Autonomous Okrug
oil and gas complex (including oil and natural gas production, transportation, processing and export)			+	+	+		+	+
marine economy complex includes fishery, sea transport, shipbuilding, production of equipment for the development of the resources of the ocean	+	+			+	+	+	+
mining complex;	+	+	+	+		+	+	+
timber industry complex;		+						
transboundary transport and logistic structures (ports, oil and gas pipelines)	+	+			+	+	+	+
tourism and recreation	+	+	+	+	+	+	+	+
Development of infrastructure (market, production, social infrastructure)	+	+	+	+	+	+	+	+

will still remain differentiated compared to the average ratio for the Russian Federation. This should be supported by the priority directions of the economic development of the Russian Arctic Zone regions, which we determined with due account for some research papers [1, p. 271; 6, p. 25, 31-36; 7, p. 671-675; 8, p. 313-341]: 1) oil and gas complex (including oil and natural gas production, their transportation, processing and export); 2) marine economy complex – the fishery, sea transport, including the servicing of the Northern sea route, shipbuilding, production of equipment for ocean resources development; 3) mining complex; 4) forestry complex; 5) tourism and recreation; 6) development of infrastructure (market, industrial and social infrastructure); 7) formation of contact structures and functions, including transboundary ones, such as transit transportation, oil and gas pipelines, etc.

The most promising directions of the economic development are specified for each constituent territory of the Arctic Area based on the specifics of the established social, economic and geographical factors and economic conditions (table 2).

For territories of the Arctic Zone (across various regions) the promising directions are narrower, but, in general, the prospects are also significant:

- the Murmansk Region: marine economy complex (fishery, sea transport, including services for the northern sea route, ship repairs, production of equipment for the development of the resources of the ocean); mining complex (mining and enrichment of non-ferrous and precious metal ores); tourism and recreation;

- the Arkhangelsk Region – marine economy complex (fishery, sea transport, shipbuilding, production of equipment for the development of the resources of the ocean); mining complex (mining of non-ferrous and precious metal ores, diamonds); tourism and recreation;

- the Nenets Autonomous Okrug: oil and gas complex (including oil and natural gas production, transportation, processing and export); mining complex (mining of non-ferrous and precious metal ores);

- the Komi Republic: mining complex (coal, non-ferrous and precious metal ore mining);

- the Yamal-Nenets Autonomous Okrug: oil and gas complex (including oil and natural gas production, transportation, processing and export); mining complex (mining of non-ferrous and precious metal ores);

- the Krasnoyarsk Territory: mining complex (mining non-ferrous and precious metal ores, providing services for the Northern Sea Route);

- the Republic of Sakha (Yakutia): mining complex (mining of non-ferrous and precious metal ores); marine economy complex (fishery, sea transport); tourism and recreation;
- the Chukotka Autonomous Okrug: mining complex (mining of non-ferrous and precious metal ores); marine economy complex (fishery, sea transport); tourism and recreation;

It is extremely important for all the entities of the Arctic Zone of Russia to develop infrastructural facilities (including those of market, production, and social infrastructure). However, for many territories of the Arctic zone development by shift method will become increasingly more efficient.

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